

## Recovery Plan Action Status

**Plan Name: Final Recovery Plan for Four Species of Hawaiian Ferns**

**Plan Status: Final**

**Plan Date: 10-Apr-98**

**Lead Agency: USFWS**

**Lead Office: Pacific Islands Fish And Wildlife Office**

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**792-9400 )**

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	1	11	Identify and map all extant wild populations	Ongoing Not Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Department of Defense, National Park Service, Private landowners	Research: Population Surveys	Contract, Graduate Student, Internal Field Assistance, Species Expert	This is an ongoing task, as the status of the species and their threats change constantly, including when new populations are found.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	1	12	Delineate management units	Ongoing Not Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Department of Defense, National Park Service, Private landowners	Management: Planning	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert	This task has been initiated through the development of essential plant habitat by the HPPRCC and CH designations, but needs to be refined for each species and its full recovery needs.

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No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	1	13	Ensure long-term protection of habitat	Partially Complete	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, The Nature Conservancy of Hawaii, U.S. Department of Defense, National Park Service, Private landowners	Acquisition: General	Internal Administrative, Internal Field Assistance, Internal Technical Assistance, Species Expert	This task is complete for the population of Asplenium fragile var. insulare on east Maui, which is within TNCH's Waikamoi Preserve; most of the large population scattered within Pohakuloa Training Area, which is protected through a Biological Opinion with the U.S. Army; and the extant southern Big Island populations are protected within the Olaa-Kilauea Partnership. For Ctenitis squamigera, the west Maui population is within TNCH's Kapunakea preserve; 3 individuals are in Mt. Kaala Natural Area Reserve on Oahu; 3 individuals at Puu Pane within the Schofield Barracks Military Reservation and 4 individuals within Makua Military Reservation are protected under Biological Opinions with the Army; and Castle and Cooke plans to fence the Lanai sites as part of a larger habitat management effort, through a cooperative agreement with ES. Pteris lydgatei is protected in Kawailoa Training Area and Schofield Barracks East Range, where the Army protects it in compliance with a Biological Opinion, and it is also protected within the

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										West Maui Watershed Partnership and Kahakuloa section of West Maui Natural Area Reserve. Diplazium molokaiense is protected within Waikamoi Preserve and two locations within Leeward Haleakala Watershed Restoration Partnership.

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No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	1	1411	Construct and maintain fencing, wherever possible	Partially Complete	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Department of Defense, Private landowners	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Volunteer	For Asplenium fragile var. insulare Waikamoi Preserve on Maui has been fenced for over a decade and also benefits Diplazium molokaiense, Kapunakea Preserve on West Maui has some strategic fences and more are planned over the next few years, which will also benefit Ctenitis squamigera. Mt. Kaala Natural Area Reserve conducts controlled hunting efforts with the Army, which protect Ctenitis squamigera. The Army plans to fence the three occurrences in east Makaleha as part of compliance with a Biological Opinion for Makua Military Reservation, and has fenced most of Makua Valley to restrict pig and goat access. In addition, the Army will fence populations of Pteris lydgatei in Kawaihoa and Schofield Barracks East Range. Castle and Cooke plans to fence the Lanai Ctenitis squamigera sites as part of a larger habitat management effort, through a cooperative agreement with ES. Diplazium molokaiense's other two occurrences are within the Leeward Haleakala Watershed Restoration Partnership, which

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										is still primarily in the planning stages but will include fencing to exclude ungulates. West Maui Watershed Partnership, which includes the West Maui Natural Area Reserve, has constructed some strategic fences and plans more to benefit Pteris lydgatei.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	2	1412	Consider eradication programs for control of ungulates	Discontinued	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Private landowners	Management: Habitat Maintenance and Manipulation	Contract, Internal Field Assistance, Volunteer	This task has been abandoned because the political climate in Hawaii at this time will not support island-wide eradication of nonnative ungulates, which are hunted for food.

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No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	1	142	Conduct alien plant control	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, The Nature Conservancy of Hawaii, Castle & Cooke, Inc., U.S. Department of Defense, Private landowners	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Contract, Internal Field Assistance, Species Expert, Volunteer	Waikamoi Preserve on east Maui and Kapunakea Preserve on west Maui have programs in place controlling the major habitat altering weeds. West Maui Watershed Partnership plans to do the same for most of west Maui. The Army plans to control weeds in east Makaleha and in Schofield Barracks East Range and Kawaihoa Training Area as part of compliance with a Biological Opinions for Makua Military Reservation and Oahu training areas. Castle and Cooke plans to control the major habitat altering weeds at the Lanai Ctenitis squamigera sites as part of a larger habitat management effort, through a cooperative agreement with ES. Leeward Haleakala Watershed Restoration Partnership plans to control the major habitat altering weeds on leeward Haleakala.

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No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	1	143	Provide necessary fire protection	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Department of Defense, Private landowners	Management: Habitat Maintenance and Manipulation	Contract, Internal Field Assistance, Volunteer	Fuel management barriers are being constructed in Pohakuloa Training Area to protect Asplenium fragile var. insulare in compliance with a Biological Opinion. Fire management plans have been developed by the Army for Makua Military Reservation, Kawaihoa Training Area and Schofield Barracks East Range and are fully implemented for Makua and have started being implemented at the other military sites. Leeward Haleakala Watershed Partnership is including fire management in the plan it is currently developing.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	1	144	Propagate and maintain genetic stock of each fern taxon ex situ	Ongoing Not Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Botanical Gardens, Hawaii Department of Land and Natural Resources, U.S. Department of Defense, Private landowners	Management: Propagation	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert, Volunteer	While spores of all four species are in ex situ storage, none have been germinated and successfully grown into reproductive sporophytes.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	1	145	Protect areas from human disturbance	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Department of Defense, Private landowners	Management: Habitat Maintenance and Manipulation	Contract, Graduate Student, Internal Field Assistance, Volunteer	The Army is the major risk of impact from human activities, and these have been addressed both through fire management plans and through standard operating procedures to minimize impacts while troops hike through Kawaihoa and East Range.

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No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	1	146	Control all other identified threats	Obsolete			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Department of Defense, Private landowners	Management: Disease Control, Management: Predator and Competitor Control	Contract, Graduate Student, Internal Field Assistance, Species Expert	This task is obsolete since no additional threat has been detected.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	2	21	Select populations for expansion	Ongoing Not Current	FY 2009		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Private landowners	Management: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert	This task has been initiated for DipMol, CteSqu, and PteLid, but is still in initial assessment stage.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	2	22	Prepare sites and plant	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, Private landowners	Management: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert	This task has not been started because the methods of propagation are not yet developed to provide material for augmentation.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	2	31	Collect diagnostic data on crucial associated ecosystem components	Ongoing Not Current	Prior to FY 1995		Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Habitat Requirements, Research: Habitat Status	Contract, Graduate Student, Internal Field Assistance	Critical habitat, and the suitable habitat from which critical habitat was derived, has been identified for all species in this recovery plan. Additional studies are needed to develop more precise microclimate needs for each species.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	2	32	Map alien vegetation	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Habitat Status	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert, Volunteer	



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No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	2	33	Study selected aspects of growth and reproductive viability	Ongoing Not Current	Prior to FY 1995		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Demographic Studies, Research: Population Surveys	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert, Volunteer	The current knowledge has been gathered mainly from incidental observations during field surveys and monitoring. More detailed experimental research is needed to fully understand these aspects of the species.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	3	34	Determine parameters of viable populations	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Other: Regulations, Research: Demographic Studies, Research: Genetics, Research: Habitat Requirements, Research: Habitat Status, Research: Management Techniques, Research: Population Surveys, Research: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert	

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No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	2	35	Determine effective control methods for feral animals and alien weed threats, as needed	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control, Research: Habitat Status, Research: Management Techniques	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert, Volunteer	Control of alien plants is an ongoing task that may be reduced to low maintenance and monitoring levels, but will never be completely eradicated, especially as new pest plant species are continually introduced to Hawaii and can become established in natural areas. Effective control methods are continually being developed by the Invasive Species Committees on each island and the results are applied to other natural areas. Control of feral animals is well understood and is being implemented in many areas for these species.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	2	36	Evaluate results and use in future management	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division, Private landowners	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control, Research: Management Techniques	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert, Volunteer	See task #35.

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No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	3	4	Develop and maintain longterm monitoring programs for all species	Ongoing Not Current	FY 1995 - FY 1999		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division, Private landowners	Research: Population Surveys	Contract, Graduate Student, Internal Field Assistance, Species Expert	This task is ongoing, but has not been as frequent as it should be. The Army and the Oahu and Maui Nui genetic safety net coordinators will take on this task for all species but Ctenitis squamigera, which also needs to be monitored.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	3	51	Investigate feasibility and desirability of reintroduction	Ongoing Not Current	FY 2008		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Research: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert	Propagation methods for some species are in the works, and reintroduction is being considered for those species.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	3	52	Develop and implement specific plans for reestablishment	Ongoing Not Current	FY 2011		U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division, Private landowners	Management: Planning, Management: Reintroduction	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert, Volunteer	This task has been initiated for Diplazium molokaiense and Asplenium fragile var. insulare, both of which have now been propagated successfully.
No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	3	61	Determine number of populations and individuals needed for long-term survival	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, National Park Service	Other: Regulations, Research: Competition, Research: Demographic Studies, Research: Habitat Requirements, Research: Habitat Status, Research: Management Techniques, Research: Population Surveys, Research: Predation	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert	

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No common name (Asplenium fragile var. insulare), No common name (Pteris lidgatei), No common name (Diplazium molokaiense), Pauoa (Ctenitis squamigera)	3	62	Refine / revise downlisting and delisting criteria	Not Started			U.S. Fish and Wildlife Service, Ecological Services Division, Hawaii Department of Land and Natural Resources, U.S. Geological Survey, Biological Resources Division	Other: Regulations, Research: Competition, Research: Demographic Studies, Research: Habitat Requirements, Research: Habitat Status, Research: Population Surveys, Research: Predation	Contract, Graduate Student, Internal Field Assistance, Internal Technical Assistance, Species Expert	